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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,314	02/13/2002	Kenji Hoshi	020171	4466

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EXAMINER

FARAHANI, DANA

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,314

Applicant(s)

HOSHI ET AL.

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 13-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Kepler et al., hereinafter Kepler (U.S. Patent 6,037,671), previously cited.

In regard to claim 13, Kepler discloses in figure 3 alignment marks (the marks shown below number 23 in the figure) in a line space pattern being divided by a micronized pattern.

In regard to claim 14, positions of the divisions 23 between the plurality of segments of the lines are offset from those of the divisions between the plurality of segments 22 of their adjacent lines.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kepler in view of the Patent Application Publication (U.S. 2001/0019401), issued to Irie

Art Unit: 2814

et al., hereinafter Irie, a newly cited reference, and further in view of Hwang et al., hereinafter Hwang (U.S. Patent 6,162,675), previously cited.

In regard to claim 1, Kepler discloses in figure 3, an alignment structure formed over a semiconductor wafer 21, each of alignment marks, shown as strip trenches in the figure, being divided by a micronized pattern.

Kepler does not disclose the micronized pattern having a size smaller than a resolution limit of an alignment sensor, nor discloses the micronized pattern having a pattern-forming margin larger than that of a device pattern formed over the semiconductor wafer.

Irie discloses in figure 1, and at pages 4 and 5, paragraph [0066], that a density filter [of light] has light blocking portions, shaped as dots, wherein the size of the dots becomes less than the resolution limit of an optical system in which the density filter is used. Furthermore, Irie discloses this structure results in higher light attenuation rate (see the above mentioned paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to introduce the micronized pattern of the Kepler reference, such that it would have a smaller size than a resolution limit of an alignment sensor in order to increase the light attenuation rate.

Hwang discloses in figure 15, a DRAM cell with a device pattern margin (that is the pattern of gates 206). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make adjustments in alignment mark patterns in a particular masking situation to conform to the stepper used in the masking process. A

Art Unit: 2814

change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

In regard to claim 2, the pattern in Kepler is a line and space pattern.

In regard to claim 3, in Kepler, each of lines constituting the line and space pattern is divided into a plurality of segments (see figure 3).

In regard to claim 4, in Kepler, positions of the divisions between the segments of the lines are offset from those of the divisions between the pluralities of segments of their adjacent lines.

5. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kepler, as applied to claim 13 above, and further in view of Hwang.

Kepler discloses the limitation in the claims, as discussed above, but does not expressly disclose a semiconductor device pattern is smaller than a margin of the alignment pattern. However, Kepler discloses at column 4, lines 41-45 that the dimensions of the marks are determined in a particular masking situation.

Hwang discloses in figure 15 a DRAM cell with a plurality of gates 206. It would have been obvious to one of ordinary skill in the art at the time of the invention to make adjustments in alignment mark patterns in a particular masking situation to conform to the stepper used in the masking process.

Art Unit: 2814

Response to Arguments

6. Applicant's arguments filed 5/30/03 have been fully considered but they are not persuasive.

In regard to applicants' argument that the feature that the micronized pattern dividing the alignment marks has a smaller size than a resolution limit of an alignment sensor is not disclosed by Kepler, note that this limitation is rendered obvious over Kepler in view of the newly cited reference Irie.

In regard to applicants' argument that the relationship between pattern forming margins of the micronized pattern and the device pattern is not disclosed by Kepler, note that, as above rejections and case law make it clear, this limitation is rendered obvious over Kepler in view of the secondary references, as discussed above.

In regard to applicants' argument that Kepler does not disclose alignment marks are divided into a plurality of segments, note that in fact there are plurality of segments, as clearly shown in figure 3 of Kepler, and the segments are actually bracketed.

It is now believed all of applicants' argument are considered and responded to accordingly.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2814


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D. Farahani
July 31, 2003


LONG PHAM
PRIMARY EXAMINER